REMARKS

The Examiner has rejected claims 1, 4, 7-8, 10-12, 15-19 and 21-22 under 35 U.S.C. § 103(a) as being unpatentable over Hongel, United States Patent No. 4,959,746 in view of Sellers, U.S. Patent No. 6,863,789 and Long, U.S. Patent No. 3,437,188. Claim 9 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Hongel '746 patent in view of the Sellers '789 patent, the Long '188 patent and Beurrier, U.S. Patent No. 3,694,765. Claim 20 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Hongel '746 patent in view of the Sellers '789 patent, the Long '188 patent and Blain et. al., U.S. Patent No. 6,347,024. While applicant believes that the previously presented claims defined over the cited references, applicant has amended such claims to more clearly define the invention for which protection is sought. Reconsideration of the Examiner's rejections is respectfully requested in view of the following comments.

Claim 1 defines a device for preventing arcing between contacts of a switching device as the contacts of the switching device are opened. The switching device includes a coil for controlling the opening of the contacts. The device includes a coil suppression circuit connected in parallel to the coil. The coil suppression circuit dissipates the energy stored in the coil in response to the de-energization of the coil. The coil suppression circuit includes a first zener diode having a cathode connected to the coil and an anode. In addition, the coil suppression includes a second zener diode having a cathode operatively connected to the anode of the first zener diode and an anode. A driver has an input operatively connected to the anode of first zener diode and an output. A first solid state switch has a gate operatively connected to output of the driver and is connected in parallel with the contacts. The first solid state switch is movable between an open position for preventing the flow of current therethrough and a closed position. Current flow to the driver is prevented in response to energization of the coil. On the other hand, the first zener diode generates a reference voltage in response to the de-energization of the coil. The driver closes the first solid state switch in response to the reference voltage across

the first zener diode. As hereinafter described, nothing in cited references shows or suggests a device for preventing arcing between contacts of a switching device as the contacts of the switching device are opened that incorporates a coil suppression circuit having a zener diode connected to a coil that provides a reference voltage to a driver in response to de-energization of the coil, and yet, prevents the flow of current to the driver in response to energization of the coil.

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. MPEP § 2142. As stated in MPEP § 2143, "To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." MPEP §2143, (emphasis added).

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). To establish a *prima facie* obviousness rejection, the Examiner must not only show that the combination includes each and every element of the claimed invention, but also provide "a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). That is, "[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art." MPEP § 2143.01. "The fact that references can be combined require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the

hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P. Q. 2d 1434 (Fed. Cir. 1988). Applicant believes that a *prima facie* case of obviousness has not been established and one cannot be made based on the art of record.

The Hongel '746 patent discloses a relay contact protective circuit that prevents arcing between contacts of the switching device as the contacts of the switching device are opened. The device includes coil 10a (Fig. 4) for controlling the opening of contacts 10b. The coil suppression circuit is connected in parallel with coil 10a between the positive and negative terminals of coil 10a. The coil suppression circuit includes DC to DC converter 250 that powers multivibrators 300 and 302, for reasons hereinafter described. It is noted that amplifier 206 energizes both converter 250 and coil 10a simultaneously on start-up. See, Hongel '746 patent, column.11, lines 38-40. As such, unlike claim 1 which requires current flow to the driver to be prevented in response to energization of the coil, the protective circuit disclosed in the '746 patent provides current flow (energization) to the convertor 250 and to the coil 10a on start-up. This is a more than an insubstantial change. More specifically, it can be appreciated that given the continual presence of voltage across the coil suppression circuit during energization of the coil disclosed in the '746 patent, heat must be continually dissipated by the coil suppression circuit disclosed therein. This, in turn, increases the overall cost and may potentially decrease the reliability of the protective circuit disclosed in the '746 patent. On the other hand, the need for an arrangement to dissipate the heat generated by the coil suppression circuit is substantially reduced or eliminated in the device of independent claim 1 since the device only operates during de-energization of the coil.

In addition, referring to column 10, line 48+ of the '746 patent, activation of the DC to DC converter triggers multivibrator 300 to turn on MOSFETs 26 prior to the closing of contacts 10B so as to shunt current around the contacts. A short time thereafter, multivibrator 300 returns to its stable state and MOSFETs 26 turn off such that contacts 10B carry the full current of load 24. Id. at column 11, lines 51-53. Thereafter, if the control signal is turned off or falls below the hysteresis band of amplifier 206, converter 250 shuts down whereby coil 10A is de-energized. Referring to column 10, lines 65+:

> Multivibrator 302 operates when converter 250 is shut-down and requires a source of power following termination of the isolated DC output. To this end, capacitor 346 and diode 348, connected in series, couple the aforementioned terminal 293 and reference voltage 295, while resistor 350 is disposed in parallel with diode 348. Thus when DC-to-DC converter 250 is active capacitor 346 charges through resistor 350, but when converter 250 shuts down **capacitor 346 discharges through diode 348** to provide power to multivibrator 302.

As described, converter 250 continually provides a DC voltage to multivibrators 300 and 302 during operation of the relay contact protective circuit. Further, unlike the structure of claim 1 which requires: 1) the first zener diode (connected to the coil) to provide a reference voltage generated by the de-energization of the coil; and 2) the driver to close the first solid state switch in response to the reference voltage across the first zener diode; the zener diode connected to the coil in the '746 patent does not generate a reference voltage in response to de-energization of the coil and the driver does operate in response to any voltage across such diode. The structure in the '746 patent is dependant upon a continually charged capacitor downstream of the coil to discharge in response to de-energization of the coil. This structure is unlike the circuit of the present invention wherein coil suppression circuit is actuated only when the coil is de-energized. As is known, when the coil voltage is removed, a coil releases all of its energy. In the claimed device, a portion of the energy is released by the coil is dissipated by the first zener diode such that the first zener diode generates a reference voltage. In

response to this reference voltage, the driver closes the first solid state switch. Such is not the case in the device disclosed in the '746 patent. This is a significant structural difference.

Neither the '789 or '188 patents can overcome the limitations of the Hongel reference. The Examiner appears to have selected isolated teachings in the various references to render the claimed invention obvious. The '789 patent merely discloses a schematic view of a voltage clamp. Referring to column 4, lines 54+ of the '789 patent, the voltage clamp limits the amplitude of the voltage applied to the load. On the other hand, the '188 patent merely teaches the fact that a reference voltage may be obtained at a node between the diodes. However, just like the Hongel reference, nothing in the '789 patent or the '188 patent teaches or suggests a device for preventing arcing between contacts of a switching device as the contacts of the switching device wherein:

1) the cathode of the first zener diode is connected to a coil;
2) the input of a driver is operatively connected to the anode of the first zener diode;
3) current flow to the driver is prevented in response to energization of the coil;
4) a reference voltage is generated across the first zener diode by de-energization of the coil; **and**
5) the driver closes the first solid state switch in response to the reference voltage across the first zener diode.

This combination of structural elements is not contemplated by the '789 patent, the '188 patent or the '746 patent. There is no implicit or explicit teaching in the cited references for the suggested combination. The mere fact that references *can be combined* is not enough. The examiner has provided no reason for the suggested combination other than the hindsight gained from the invention itself. Consequently, it is believed that claim 1 defines over the '746 patent and is in proper form for allowance.

Claims 4 and 7-11 depend either directly or indirectly from independent claim 1 and further defines a device not shown or suggested in the art. It is believed that claims 4 and 7-11 are allowable as depending from an allowable base claim and in view of the subject matter of each claim.

Referring to claim 12, a bypass circuit is provided for preventing arcing of an electrical energy path between first and second contacts of a switching device having a coil wherein the contacts opening close in response to energization of the coil. The bypass circuit includes a first switch connected in parallel with the contact of the switching device. The first switch is movable between a closed position with the contacts open and an open position with the contacts closed. A voltage reference device is directly connected to the coil. The voltage reference device provides a reference voltage generated by de-energization of the coil. An actuation circuit interconnects the coil and the first switch. The actuation circuit closes the first switch in response to the reference voltage. The voltage reference device prevents current flow to the actuation circuit in response to energization of the coil.

As heretofore described with respect to independent claim 1, none of the cited references show or suggest a device for preventing arcing between contacts of a switching device as the contacts of the switching device wherein a voltage reference device directly connected to the coil generates a reference voltage in response to de-energization of the coil such that an actuation circuit closes a first switch across the contacts in response to the reference voltage. Further, none of the cited references show or suggest a voltage reference device that prevents current flow to the actuation circuit in response to energization of the coil. Such a structure is entirely absent from cited references. Consequently, it is believed that independent claim 12 defines over the cited references and is in proper form for allowance.

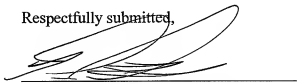
Claims 15-17 depend from claim 12 and further define a bypass circuit not shown in the art. It is believed that claims 15-17 are allowable as depending from an allowable base claim and in view of the subject matter of each claim.

Claim 18 defines a bypass circuit for preventing arcing of electrical energy passing to the first and second contacts of a switching device having a coil wherein the contacts open and close in response to energization of the coil. The bypass circuit includes a first switch connected in parallel with the contacts of the switching device. The first switch is movable between an open position and a closed position. An energy dissipation device is directly connected to the coil for providing a reference voltage for a predetermined time period generated by de-energizing coil. A driver interconnects the energy dissipation device and the first switch. The driver closes the first switch prior to the opening of the contacts in response to the reference voltage. In addition, the energy dissipation circuit prevents current flow to the driver in response to energization of the coil.

Again, as heretofore described with independent claims 1 and 12, nothing in the cited references shows or suggests a bypass circuit for preventing arcing between contacts of a switching device as the contacts of the switching device open and close wherein an energy dissipation device is directly connected to the coil and generates a reference voltage in response to de-energization of the coil such that a driver closes a first switch across the contacts in response to that reference voltage. Further, none of the cited references show or suggest an energy dissipation circuit that prevents current flow to the driver in response to energization of the coil. Such a structure is entirely absent from cited references. Consequently, it is believed that independent claim 18 defines over the cited and is proper form for allowance. Claims 19-22 depend either directly or indirectly from independent claim 18 and further define a bypass circuit not shown or suggested in the art. It is believed that claims 19-22 are allowable as depending from an allowable base claim and in view of the subject matter of each claim.

Applicant believes that the present application with claims 1, 4, 7-12, and 15-22 is in proper form for allowance and such action is earnestly solicited. The Director is hereby authorized to charge payment of any additional fees associated with this or any other communication or credit any overpayment to Deposit Account No. 50-1170.

Respectfully submitted,



Peter C. Stomma, Reg. No. 36,020

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BOYLE FREDRICKSON, S.C.
840 North Plankinton Avenue
Milwaukee, WI 53203
Telephone: (414) 225-9755
Facsimile: (414) 225-9753